

ABSTRACT

The object of the invention is to provide a porous metal structure body suitable for reinforcing a light metal alloy member such as an aluminum alloy member. A mixed powder containing a metallic powder is filled in a mold, and is molded into a shape having a single cavity or plural cavities in the inner portion while having a maximum thickness of 6 mm or less at the surface portion side. The molded powder body is sintered to form into the porous metal structure body having a porosity of 20 to 50% by volume at the portions except the cavities. It is preferable that the metallic powder sintered body having a porosity of exceeding 50% by volume is formed into the cavities by being monolithically integrated with the porous metal structure body. Consequently, a structure being lightweight, having a high mechanical strength and being excellent in handling performance while being excellent in impregnability can be obtained.

Table 1

Example No.	Structure											Characteristics after enveloping by casting		Note		
	Prescribed shape	Portion except cavity					Cavity portion				Handling performance					
		Content (% by mass)				Porosity (% by vol)	Maximum thickness of surface portion side mm	Content (% by mass)				porosity (% by vol)				
		Cr	C	Others	Fe			Cr	C	Others			Fe			
1	FIG. 1A	120	0.3	1.0 or less	bal.	22	5	55.0	2.0	2.0	Bal.	62	Good	1.3	14.7	Example of the invention
2	FIG. 1A	120	0.3	1.0 or less	bal.	22	5	55.0	2.0	2.0	Bal.	51	Good	1.2	13.6	Example of the invention
3	FIG. 1A	120	0.3	1.0 or less	bal.	22	5	-	-	-	-	-	Good	1.3	17.4	Example of the invention
4	FIG. 1B	120	0.3	1.0 or less	bal.	22	5	55.0	2.0	2.0	Bal.	62	Good	1.3	14.1	Example of the invention
5	FIG. 1B	120	0.3	1.0 or less	bal.	22	5	-	-	-	-	-	Good	1.3	16.8	Example of the invention
6	FIG. 1C	120	0.3	1.0 or less	bal.	22	5	55.0	2.0	2.0	Bal.	62	Good	1.3	12.9	Example of the invention
7	FIG. 1C	120	0.3	1.0 or less	bal.	22	5	-	-	-	-	-	Good	1.3	15.1	Example of the invention
8	FIG. 1A	120	0.3	1.0 or less	bal.	47	5	55.0	2.0	2.0	Bal.	62	Good	1.4	14.4	Example of the invention
9	FIG. 1A	300	2.0	1.0 or less	bal.	23	5	55.0	2.0	2.0	Bal.	62	Good	1.2	13.5	Example of the invention
10	FIG. 1A	300	2.0	1.0 or less	bal.	23	5	45.0	2.5	2.0	Bal.	61	Good	1.1	14.6	Example of the invention
11	FIG. 1A	120	0.3	1.0 or less	bal.	53	5	55.0	2.0	2.0	Bal.	62	Poor	-	-	Comparative example
12	FIG. 1A	120	0.3	1.0 or less	bal.	48	6.5	55.0	2.0	2.0	Bal.	62	Good	0.9	-	Comparative example
13	FIG. 1A	120	0.3	1.0 or less	bal.	48	5	55.0	2.0	2.0	Bal.	49	Good	0.8	-	Comparative example

*) Strength ratio = σ/σ_0 , σ_0 : bonding strength of cast iron plated with aluminum